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A Table for facilitating the determination of Mean Equinoctial Time to the end of the present Century.

By Vice-Admiral Sir Charles Shadwell.

In the *Nautical Almanac*, from the year 1834 (the date of its first appearance in its present improved form) up to 1875 inclusive, information was formerly given, at page 20 of each month, to facilitate the determination of 'Mean Equinoctial Time.'

From and after 1876 this information has been altogether discontinued. No reason has been assigned, either in the 'Annual Prefaces' or in the 'Explanations' of that volume, for this omission. It is, however, understood to have been withdrawn because it had never come into general use among astronomers, as had been anticipated at the time of its first introduction.

Since the use of equinoctial time afforded a means of reckoning time free from the necessity of specifying any particular geographical locality, being measured from an epoch common to all the world (viz. the passage of the mean Sun through the mean vernal Equinox) and identifiable independently of all localities, thus avoiding all ambiguities in its description, its disappearance from the pages of the National Ephemeris is, I think, to be regretted.

With a view to rectify this omission to a certain extent, and to afford those desirous of employing equinoctial time the means of doing so in future, the accompanying Table, giving the data for its determination up to the end of the present century, is herewith submitted to the notice of the Royal Astronomical Society:—

Table for facilitating the determination of Mean Equinoctial Time.

Equinoctial Year.	Date of Commencement.	Number. N.	Fraction of Equinoctial Time for the Year to be added to the Equinoctial Day.
	March.		d
1875–76	22	81	0·574169
1876–77	21	81—80	0·331953
1877–78	21	80	0·089737
1878–79	22	81	0·847521
1879–80	22	81	0·605305
1880–81	21	81—80	0·363089
1881–82	21	80	0·120873
1882–83	22	81	0·878657
1883–84	22	81	0·636441
1884–85	21	81—80	0·394225

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Equinoctial Year.	Date of Commencement.	Number. N.	Fraction of Equinoctial Time for the Year to be added to the Equinoctial Day.
	March.		d
1885–86	21	80	0·152009
1886–87	22	81	0·909793
1887–88	22	81	0·667577
1888–89	21	81—80	0·425361
1889–90	21	80	0·183145
1890–91	22	81	0·940929
1891–92	22	81	0·698713
1892–93	21	81—80	0·456497
1893–94	21	80	0·214281
1894–95	22	81	0·972065
1895–96	22	81	0·729849
1896–97	21	81—80	0·487633
1897–98	21	80	0·245417
1898–99	21	80	0·003201
1899–1900	22.	81	0·760985

Explanation of the Table.

This Table contains for the equinoctial years named, that is for the years 1875–76 to 1899–1900 inclusive, 1st, in column 2, the day on which the equinoctial year commences; 2ndly, in column 3, the number N; 3rdly, in column 4, the fraction of equinoctial time to be added to the day of the equinoctial year.

N is the number of days which is to be subtracted from the 'day of the year' (increased if necessary by 365) to give the corresponding day of the equinoctial year; the day of the year corresponding to any given date being taken from the Table published annually in the *Nautical Almanac* commencing with 1876 ('Day of the Year,' &c., pp. 484 &c.)

This number is generally 81, but sometimes 80. When both numbers are given, 81 is to be subtracted from the day of the year between the vernal Equinox and December 31, and 80 between January 1 of the following year and the succeeding Equinox.

Application of the Table.

I. To find when the equinoctial year commences:—

To the date in column 2 add the complement to unity of the fraction in column 4.

Thus the equinoctial year 1884–85 commences on March $21^{d}+(1-0{\cdot}394525)$, or on March $21^{d}{\cdot}605775$ Greenwich Mean Time.

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So again the equinoctial year 1894–95 commences on March $22^{d}+(1-0·972065)$, or on March $22^{d}·027935$ Greenwich Mean Time.

II. To find the mean equinoctial time corresponding to Greenwich mean noon on any given day:—

From the day of the year, increased if necessary by 365, subtract the number N, and affix the fraction for the year from column 4.

Thus: Required the equinoctial time at Greenwich mean noon on May 13, 1878.

Here the day of the year corresponding to May 13 would be 132, and in the equinoctial year 1878–79 N is 81, and the fraction of equinoctial time $0^{d}·847521$.

Therefore, $132^{d}-81^{d}+0^{d}·847521$; or 1878^{y} $51^{d}·847521$ is the mean equinoctial time at Greenwich mean noon on the day in question.

Again: What will be the equinoctial time at Greenwich mean noon on February 5, 1893?

The day of the year corresponding to February 5, 1893, is 35, and in the equinoctial year 1892–93, N between January 1 and the following vernal Equinox is 80, while the fraction of equinoctial time to be added is $0^{d}·456497$.

Hence, $35^{d}+365^{d}-80^{d}+0^{d}·456497$, or $320^{d}·456497$, is the mean equinoctial time at Greenwich mean noon on February 5, 1893, which is required.

Note.—Should it ever be deemed expedient to reintroduce "mean equinoctial time" to a place in the *Nautical Almanac*, it would not be necessary to assign to it a column in a page for each month, as under former arrangements previous to 1876. All that would be requisite would be to give, in a note at the foot of the Table "Day of the Year, &c.," the number N and the fraction of equinoctial time to be employed, both before and after the vernal Equinox of the current year, with a brief explanation of how they were to be applied; this last being given in the "Explanation of the Articles" at the end of the work.

A very slight alteration of the present arrangement of the type in the Table referred to, and a corresponding brief addition to the "Explanation," would permit this.

Meadowbank, Melksham,
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Description of an Improved Diagram for the Graphical Solution of Spherical Triangles, applicable to the questions arising out of the Spheroïdal Figure of the Earth, treated in the Paper read before the Society Nov. 10 ult., and further illustrated by the case of the Prediction of Occultations. By F. C. Penrose, Esq.

The Table, which should have accompanied the paper referred to, giving the values of *n*—namely the distance between the centre of the Earth and the foot of the normal in different latitudes—and